CROWN: Conversational Passage Ranking by Reasoning over Word Networks
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MOTIVATION
★ Information needs rarely one-off
★ Users ask several follow-up queries on a topic of interest
★ Follow-up queries possibly incomplete and ungrammatical, with references to previous turns
★ Key challenge: Understand context left implicit by user

METHOD
★ CROWN is an unsupervised method for passage ranking
★ Pseudo-relevant passages obtained with any standard retrieval system (e.g. Indri) using an expanded conversational query
★ CROWN models passage relevance as a combination of similarity and coherence
★ Creates a Word Proximity Network (WPN) from any large corpus as backbone for passage scoring
★ The WPN stores statistically significant co-occurrences of words, within a context window, as measured by Normalized Pointwise Mutual Information (NPMI)
★ Similarity between query and passage terms measured in terms of embedding vectors (node weights)
★ Coherence measured using proximities of significant pairs of passage terms, that are similar to a query term (edge weights)

RESULTS
★ Method is robust with respect to turn depth
★ Submitted four runs that explored variations of CROWN
★ Three out of four were better than median performance over all submitted runs (with respect to AP@5 and nDCG@1000) on evaluation data

SAMPLE CONVERSATION
Turn 1: What flowering plants work for cold climates?
Turn 2: How much cold can pansies tolerate?
Turn 3: What’s the UK hardiness rating?

1. Query expansion

2. Candidate passage retrieval

3. Node and edge weight calculation

4. Final passage scoring

ADDRESS: "Winter pansies have a hardiness rating of H5 in the UK. They can survive cold climate. Furthermore, they..." [P2]